

- wherein the plurality of vanes compress a vapor in to a compressed vapor an evaporative condenser comprising:
- a plurality of tubes, the plurality of tubes having inner surfaces and outer surfaces; and
  - an outer chamber;
- wherein an evaporator section is defined by the inner surfaces of the plurality of tubes and a condenser section is defined by the outer surfaces of the plurality of tubes and the outer chamber,
- wherein the evaporator section is fluidly connected to the sump for transforming the intake stream of water to vapor and a blowdown liquid stream, the vapor provided to the compressor and the condenser section is fluidly connected to the compressor for transforming compressed vapor into a product water stream; and
- a heat exchanger comprising:
- a first path fluidly connecting the intake to the sump; and
  - a second path fluidly connecting the condenser section to the product water outlet; wherein the intake stream of water is heated by cooling the product water stream in the second path.
- 24.** The Water distillation system of claim **23**, wherein the chemical additive pretreatment comprises the addition of one or more of the following group of chemicals, polyphosphates, polyacetates, organic acids, and polyaspartates.
- 25.** The Water distillation system of claim **24**, wherein the chemical additives are added in a liquid form using a pumping mechanism.
- 26.** The Water distillation system of claim **25**, wherein the pumping mechanism is a roller pump or a pulsatile pump.
- 26.** The Water distillation system of claim **25**, wherein the pulsatile pump comprises a standard diaphragm pump or piezoelectric diaphragm pump.
- 27.** The Water distillation system of claim **23**, wherein the electrochemical pretreatment comprises an oscillating magnetic field, an oscillating electrical current, or UV treatment.
- 28.** The Water distillation system of claim **25**, wherein the chemical additives are added with a syringe pump.
- 29.** The Water distillation system of claim **23**, wherein the chemical additives may be added to a holding volume or reservoir, where the additives are mixed with the intake fluid.
- 30.** The Water distillation system of claim **23**, wherein the chemical additives are added in solid form.
- 31.** The Water distillation system of claim **30**, wherein the solid form is a matrix, the matrix being in the flow-through channel of the intake.
- 32.** The Water distillation system of claim **30**, wherein the solid form is added to a holding volume or reservoir, wherein the additive mixes with the intake fluid.
- 33.** The water distillation system of claim **23**, wherein the compressor further comprises an inlet port for receiving the vapor and an outlet port for delivering the compressed vapor.
- 34.** The water distillation system of claim **23**, wherein the compressor further a pressure boundary; the motor rotor housed within the pressure boundary and the motor stator located outside the pressure boundary.
- 35.** The water distillation system of claim **23**, wherein the heat exchanger further comprises a third path where the blowdown liquid stream is cooled by the intake stream of water.
- 36.** A water distillation system comprising:
- an intake for receiving an intake stream of water entering the water distillation system;
  - a product water outlet, the product outlet comprising a post-treatment of a product water stream;
  - a sump fluidly connected to the intake;
  - a compressor comprising:
    - a plurality of vanes;
    - a motor rotor coupled to the plurality of vanes; and
    - a motor stator;
  - wherein the plurality of vanes compress a vapor in to a compressed vapor an evaporative condenser comprising:
    - a plurality of tubes, the plurality of tubes having inner surfaces and outer surfaces; and
    - an outer chamber;
  - wherein an evaporator section is defined by the inner surfaces of the plurality of tubes and a condenser section is defined by the outer surfaces of the plurality of tubes and the outer chamber,
  - wherein the evaporator section is coupled to the sump for transforming the intake stream of water to vapor and a blowdown liquid stream, the vapor provided to the compressor and the condenser section is fluidly connected to the compressor for transforming the compressed vapor into a product water stream; and
  - a heat exchanger comprising:
    - a first path fluidly connecting the intake to the sump; and
    - a second path fluidly connecting the condenser section to the product water outlet; wherein the intake stream of water is heated by cooling the product water stream in the second path.
- 37.** The water distillation system of claim **36**, wherein the post-treatment comprises adding an additive into the product water stream.
- 38.** The water distillation system of claim **37**, wherein the post-treatment comprises pumping the additive in to the product water stream with a pump.
- 39.** The water distillation system of claim **37**, wherein the additive is at least one selected from the group consisting of a sugar-based additive, an acid, and a mineral.
- 40.** The water distillation system of claim **37**, wherein the additive is at least one selected from the group consisting of a nutrient, a vitamin, a stabilized protein, and a fat.
- 40.** The water distillation system of claim **37**, wherein the additive is a taste additive.
- 41.** The water distillation system of claim **36**, wherein the post-treatment comprises exposing the distilled liquid product to UV light.
- 42.** The water distillation system of claim **36**, wherein the post-treatment comprises measuring a physical property of the product water stream.
- 43.** The water distillation system of claim **42**, wherein measuring a physical property of the product water stream selected from the group consisting of measuring pH, measuring conductivity, measuring hardness, and measuring a concentration of a component in the product water stream.